

# EIC@IP6 - Next Steps

The background features a vibrant blue gradient with glowing green and blue lines and starbursts. On the right side, there is a cluster of several overlapping, semi-transparent spheres. Each sphere contains a complex molecular model, likely representing a protein or a similar biological structure, with various colored atoms and connecting bonds.

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# Outline

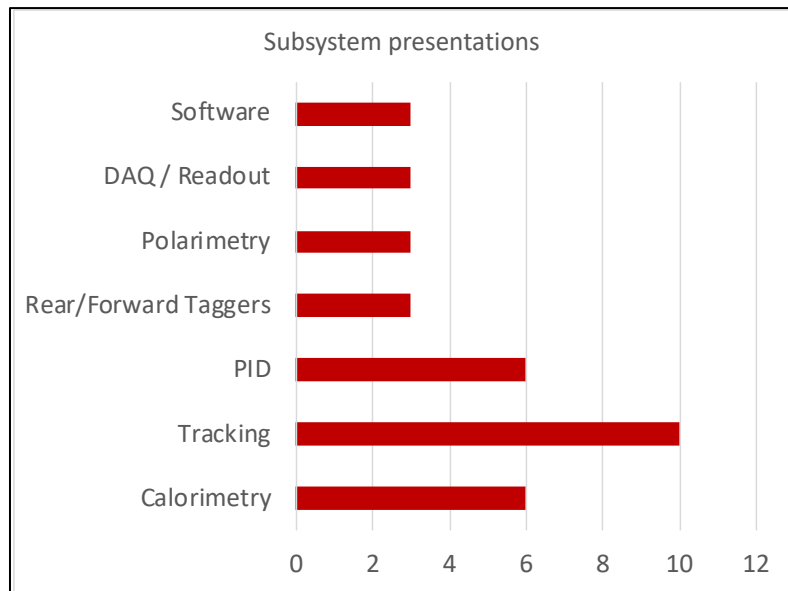
- ❑ Short summary of this EIC@IP6 kick-off meeting
  - ✓ Why are we here?
  - ✓ What did we learn these past 2 days
  
- ❑ A proposal for next steps, to be discussed:
  - ✓ Hardware-wise
  - ✓ Physics and Simulation-wise
  - ✓ Collaboration-wise
  - ✓ Organization-wise

# Call for Collaboration Proposals for Detectors

- **Detector 1:**
  - **Experiments must address the EIC White Paper and NAS Report science case.** The collaboration should propose a system that meets the performance requirements described in the EIC CDR and EICUG YR. The design should be compatible with that of the accelerator and interaction region layout of the CDR. Completion of detector construction must be achieved by Critical Decision (CD)-4A, the start of EIC accelerator operations
- **The Proposals should include two parts:**
  - **A description of the science addressed and performance estimated through simulation** including, but not limited to,  $e/\gamma$ , jets,  $\pi/K/p$  separation, vertex, and tracking, and how the simulated performance compares to the requirements detailed in the YR. **The realization of the conceptual detector design given the technology choices, the R&D needs, risks, and, if applicable, adoption of emerging new technologies.**
  - **A collaboration roster and structure**, timescale and cost (including potential sources of funding sources and assumptions), and potential upgrade paths.
  - If possible, the proposal should not exceed 60 pages, 40 pages for the first part and 20 for the second.

# How to build it: start with the Eols

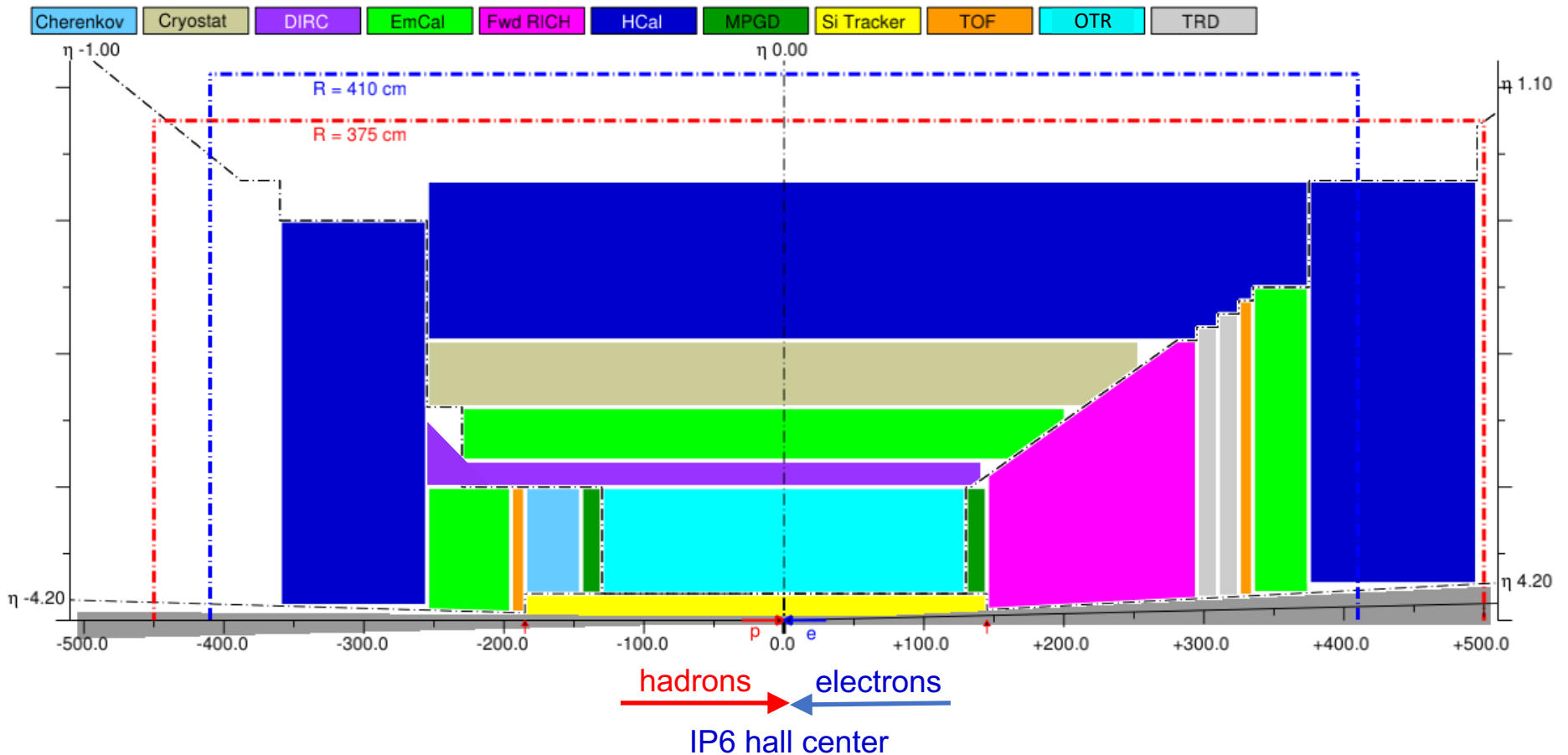
- Excellent turn-out: 34 presentations yesterday, representing 69 institutions from 8 countries
- Representing all areas of the EIC detector and associated software
- Large interest in the EIC@IP6 proposal and most will actively work on it



	IP6 interest	IP6 proposal
Yes	28	27
Maybe	6	7

**We will actively work to  
turn the Maybe's into Yes !**

# What do build: start with the YR ref. detector



- ❑ -4.5 /+5.0 m machine-element-free region for central detector
- ❑ 25 mrad crossing angle (current IP6 design)
- ❑ Individual detector component space allocations provided by the Yellow Report Working Groups

# Discussion started by Barbara

- 3T magnet with 3.2m inner diameter
- *Silicon barrel tracker, silicon + MPGD endcap(s)*
- Barrel PID: DIRC + *TOF (affordable?) +/- MPGD  $dE/dx$  if cluster counting is demonstrated (impact if only DIRC?)*
  - electron endcap PID: mRICH
  - hadron endcap PID: dual RICH
- EMCAL electron endcap:  $\text{PbWO}_4$  crystals
  - Barrel & hadron endcap: W powder or Shashlyk, whichever is cheaper
- HCAL in barrel and hadron endcap: Pb or Fe/Sc
  - Electron endcap: use thinner neutron detector to bring magnet in closer to increase luminosity
  - Can we squeeze out another 50 cm length on electron side?
- Far forward detectors & polarimetry as in YR/reference det?
- Streaming readout

**GENERATED A LOT OF DISCUSSION: EXACTLY WHAT WE WANT AT THIS POINT**

# What now ?

- Start the pre-collaboration process
  - Form the necessary boards, committees
  - Form the necessary working groups
- Start working on the Detector Proposal
  - Deadline for submission is December 1, 2021
  - Early layout of its content needed soon
- In the meantime, finalize the collaboration
- In more details ...

# Next Steps - Hardware

- **Finalize magnet specs**

## ⇒ **Detector WG**

- What full field and  $\sim 1/2$  field performances are needed?

- **Identify technologies and R&D needs in all areas**

## ⇒ **Detector WG**

- Tracking, barrel and backward/forward
- EM calorimetry
- H calorimetry
- PID barrel and backward/forward
- Very forward/backward detectors
- Polarimetry
- Readout/DAQ needs, transversal to all other items

- **Identify and answer the more controversial questions**

## ⇒ **Specific task-forces (?) or Detector WG**

- TPC vs. Tracker vs. TPC+tracker ?
- PID in the central region:
  - Do we really need PID  $< 1$  GeV/c ?
  - How to get it up to 10-12 GeV/c
- Do we need muon chambers?



# Next Steps – Physics and Simulations

- **Identify key processes from YR to verify detector capabilities**

## ⇒ **Physics & Simulation WGs**

- Choose Physics Generators

## ⇒ **Simulation WG**

- Choose the Monte-Carlo tools: Fun4All, Escalate, ...
- Help make further developments to them if needed
- Prepare simulation tools for different hardware scenarios
- Evaluate CPU needs and where to run the jobs
- Request computing accesses at Jlab or BNL to all who are willing to run simulations

# Next Steps – Collaboration & Organisation

- **Form various instances of the future collaboration**

- ⇒ **Pre-Collaboration coordinators**

- Form Institutional board
- Form a Charter Committee
- Form various WGs and name coordinators
- Form Proposal Committee

- **Organisation of the collaboration**

- ⇒ **Pre-Collaboration coordinators**

- Regular general meetings (2x / month ?)
- Choose a date for a full collaboration meeting (summer ?)

# This is it !

- **Exciting times for EIC, it's getting real**
- **Everything will move even faster now, we need to keep the pace**
- **NOW is the time to contribute shaping EIC@IP6 according to YOUR vision**
- **All are welcome to join this effort ☺**